Electronic Version
Stylesheet Version v1.1.1

Claims

[c1] What is claimed is:

1.A spectrometer suitable for analyzing the spectra composition of an optical beam, the spectrometer enabling the detection of light of a particular wavelength, the spectrometer comprising:

a.an entrance slit for allowing the entry of the optical beam into the spectrometer, the location of the entrance slit being adjustable for controlling the performance of the spectrometer;

b.a detector for detecting the optical beam, the location of the detector being adjustable for controlling the performance of the spectrometer; and

c.a curved grating for analyzing the spectra composition of the optical beam, the curved grating comprising a plurality of grooves, the distance between the grooves being dependent on the location of the entrance slit and the detector, the center of operation wavelength, the diffraction order, the refractive index of the medium and optionally on the location of the adjacent grooves.

[c2] [This claim protects the general spectrometer embodiment of the invention: entrance slit, detectors can be lo-

cated anywhere]

2.The spectrometer as recited in claim 1 wherein the entrance slit and the detector are located on the tangent circle.

[c3] [This covers constant arc length and detector and tangent circle embodiment]

3.The spectrometer as recited in claim 1 wherein the curved grating has one of the straight, sinusoidal and elliptical shapes.

[c4] 4.The spectrometer as recited in claim 1 wherein the spectrometer is in accordance with the Littrow configuration.

[c5] 5.The spectrometer as recited in claim 1 wherein the spectrometer is used as a wavelength dispersion element in a photonic integrated circuit.

[c6] 6.The spectrometer as recited in claim 1 wherein the spectrometer is used as an isolated optical spectrometer using discrete components, the discrete components including slits, gratings, spectrometer casing, detector, detector array and motor drive.

[c7] [This claim protects the embodiment in which spectrometer is used as isolated optical spectrometer]

7.A compact curved grating suitable for analyzing the

spectra composition of an optical beam, the optical beam being incident on the compact curved grating via an entrance slit, the analyzed optical beam from the compact curved grating being incident on a detector, the compact curved grating comprising a plurality of grooves, the distance between the grooves being dependent on the location of the entrance slit and the detector, the center of operation wavelength, the diffraction order, the refractive index of the medium and optionally on the location of the adjacent grooves.

[c8] [This claim protects the disclosed compact curved grating structure]

8.A method for analyzing the spectra composition of an optical beam, the method comprising:

a.adjusting location of an entrance slit in order to have best performance at a particular design goal, the optical beam entering the spectrometer through the entrance slit;

b.adjusting location of a detector in order to have best performance at a particular design goal, the spectra composition of the optical beam being detected by the detector; and

c.using a compact curve grating in order to analyze the spectra composition of the optical beam, the compact curved grating comprising a plurality of grooves, the

step of using the compact curved grating further comprising the steps of:

i.calculating initial groove spacing using the information relating to location of the entrance slit and the detector, center of the operation wavelength, refractive index of the medium and the diffraction order; and

ii.determining the positions of other grooves, the position being determined by ensuring that path difference between adjacent grooves is an integral multiple of the wavelength in the medium.

[c9] [This claim protects the disclosed method of analyzing spectra composition of an optical beam]